

## **REMARKS**

The Office Action dated October 1, 2008, has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

### **Status of the Claims**

Claims 3, 5, 11-13, 28, 30-34 and 36 have been amended to more particularly point out and distinctly claim the subject matter of the invention. No new matter has been added. Claims 3-5, 10-13 and 28-36 are currently pending in the application and are respectfully submitted for consideration.

### **Allowable Subject Matter**

Applicants note with appreciation the Examiner's indication that claims 34 and 35 recite allowable subject matter. Applicants kindly thank the Examiner for his assistance. Applicants respectfully submit that the remaining claims also recite patentable subject matter.

### **Rejections under 35 U.S.C. § 112**

Claim 33 was rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. Specifically, the Office Action asserted on pages 2 and 3 that:

Aside from applicant's allegation that an external pressure is needed without more, Applicant fails to provide a "how" or a "why" would one necessarily assume, or inherently be required, that an external pressure is needed during the placing of the original sample in the processing furnace/vane shaped mandrel. Consequently, paragraph 53 does not "inherently" support the

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limitation that an external stress is applied during the placement of the sample in the processing furnace/vane shaped mandrel. An allegation is not a showing that external pressure is inherently required.

Thus, it appears that the Examiner would like further details as to why a reshaping stress is inherently necessary during the placing of the original sample in the “processing furnace/vane shaped mandrel”. The following further explanation from Applicants is respectfully submitted.

Applicants submit that **all materials**, including the architectural performs of the claimed invention, have an inherent stiffness (a resistance to a change in shape or external dimensions). Accordingly, in order to change a perform from one shape to another, this stiffness must be overcome by the application of external pressures or stresses (governed by Hooke’s Law). The stresses necessary to change the shape of an architectural perform will vary in magnitude and direction depending on the stiffness of the perform and the degree to which a perform is reshaped. Further, with respect to Fig. 7 of the present application, in some practical embodiments, the reshaping stresses for an original **cylindrical perform shape** formed by conventional 2D braiding operations were conveniently applied **by compressing** the perform within a cavity in a two-piece solid mold that had the desired final **airfoil perform shape**. Thus, Applicants respectfully submit that a person of ordinary skill in the art would readily understand that an external force must **inherently** be applied to an architectural perform in order to change the external dimensions thereof to achieve a desired shape.

Accordingly, it is respectfully submitted that the rejection is overcome, and respectfully requested that the rejection be withdrawn.

Claims 12, 31 and 36 were rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. With respect to the recitation “high purity” in claims 12, 31 and 36, the Office Action asserted on page 4 that “[t]he term is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.” The recitations of “high purity” have been amended to “a purity greater than 99.999%”.

With respect to the recitation “improved properties...that are greater in comparison to same properties of final samples without the thermal treatment step”, the Office Action appeared to assert that the term is a relative term, rendering the claim indefinite. Specifically, the Office Action stated that “[t]he term is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention to determine the extend [sic] of ‘improvement’ to read on applicant’s claim”. Claim 36 has been amended to recite “~~improved~~ properties including ultimate tensile strength, intrinsic strength retention at high temperatures, rupture strength after matrix pre-cracking, and long-term oxidation resistance that are greater ~~in comparison to same~~than properties of final samples without the thermal treatment step” to clarify that

the claimed treatment increases these characteristics over the properties of the material without thermal treatment. Applicants respectfully traverse the rejection.

MPEP § 2173.05(b) states that:

The fact that claim language, including terms of degree, may not be precise, does not automatically render the claim indefinite under 35 U.S.C. 112, second paragraph. *Seattle Box Co., v. Industrial Crating & Packing, Inc.*, 731 F.2d 818, 221 USPQ 568 (Fed. Cir. 1984). Acceptability of the claim language depends on whether one of ordinary skill in the art would understand what is claimed, in light of the specification.

“When a term of degree is presented in a claim, first a determination is to be made as to whether the specification provides some standard for measuring that degree. If it does not, [which is not admitted] a determination is made as to **whether one of ordinary skill in the art, in view of the prior art and the status of the art, would be nevertheless reasonably apprised of the scope of the invention**” (*Id.*, emphasis added). In the present case, claim 36 has been amended to recite that certain properties of final samples with thermal treatment “are greater than properties of final samples without the thermal treatment.” Applicants submit that a person of ordinary skill in the art would readily understand, based upon properties of thermally treated final samples as claimed versus final samples that were not thermally treated, what properties derived after thermal treatment would infringe. Accordingly, since a person of ordinary skill in the art would readily appreciate the scope of the claimed invention, Applicants submit that the rejection of claim 36 with respect to the relative terminology recited therein is improper.

Accordingly, it is respectfully submitted that the rejection is overcome and respectfully requested that the rejection be withdrawn.

#### **Rejection under 35 U.S.C. § 103**

Claims 3-5, 8, 10-13 and 28-32 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over DiCarlo et al. ("SiC/SiC Composites with Improved BN Coating on Fibers") in view of Sacks (U.S. Patent No. 6,040,008). The Office Action took the position on pages 4-7 that the combination of DiCarlo et al. and Sacks teaches all of the features of the rejected claims. Applicants respectfully submit that DiCarlo et al. and Sacks, both individually and in combination, fail to teach or suggest all of the features of the above-rejected claims. Reconsideration of the claims is respectfully requested.

Independent claim 3, from which claims 4, 5, 10-13 and 28-36 depend, recites a method for producing high-strength ceramic fibers and ceramic fiber architectural preforms with an in-situ grown coating on each fiber surface with a composition different than that of a bulk fiber, including preparing an original sample composed of an architectural preform formed from an as-produced high strength ceramic fiber type. The fiber composition is based on silicon carbide (SiC) and the architectural preform includes at least one of a finite section of a continuous-length multi-fiber tow, a two-dimensional textile-formed fabric, and a three-dimensional textile-formed complex-shaped perform. The method also includes placing the original sample in a processing furnace and thermally treating the original sample in the processing furnace at a processing

temperature and a hold time of five hours or less in a processing gas having a composition, a pressure between 1 and 40 atmospheres, and a flow rate. The fiber composition, the processing temperature, the hold time, the gas composition, the pressure, and the flow rate are preselected to allow atomic decomposition from the surface of each fiber with reduced loss in an average tensile strength of the fibers within the thermally treated sample.

As will be discussed below, DiCarlo et al. and Sacks, both individually and in combination, fail to teach or suggest all of the features of the presently pending claims.

DiCarlo et al. generally discusses “SiC/SiC composites with improved BN coating on fibers” (see Title, page 1). “In order to impart strength and fracture toughness to a fiber/matrix composite material, one must formulate it so that under high stress, it fails in a fiberpullout mode rather than a brittle-fracture mode” via “a fiber/matrix interfacial layer of a material (denoted the ‘interphase’) that is weakly bonded to both the fibers and the matrix to insure that matrix cracks are deflected away from the fibers” (see page 1, second paragraph, of DiCarlo et al.).

Sacks generally discusses a method “for producing high-strength silicon carbide (SiC) fibers with uniform boron nitride (BN) coatings and improved creep resistance. The process defined herein will [allegedly] produce BN coatings on boron-doped SiC bodies or fibers originally formed by various known processes, such as by sintering, chemical vapor deposition, etc.” (column 1, lines 12-18). Sintering may occur “at

atmospheric pressure or below atmospheric pressure” (see column 4, lines 18-21, of Sacks).

Independent claim 3 recites, in part, “thermally treating the original sample in the processing furnace at ... **a pressure between 1 and 40 atmospheres**” (emphasis added). In the previous Submission filed August 18, 2008, Applicants argued with respect to claims 5, 12 and 31 that these features were not addressed in the cited art. Specifically, Applicants argued on pages 15 and 16 of the previous Submission that:

Claims 5, 12 and 31 recite “a pressure between 1 and 40 atmospheres”. The Office Action stated on pages 3 and 4 that “the atmosphere and temperature are important parameters to control when coating the fibers (Col. 3, lines 11ff [sic]). A person of ordinary skill in the art can easily envisage that flow rate, pressure, temperature and holding time are parameters that would affect the reaction to form a BN coating.” However, the only pressure discussed in Sacks is one atmosphere or less, and sometimes completely pressureless (see column 2, lines 47-50, and column 4, lines 19 and 20). As such, while pressure may be varied in Sacks, it appears that any variation in pressure **reduces** the pressure below one atmosphere. On the other hand, claims 5, 12 and 31 recite a pressure between 1 and 40 atmospheres. As such, the pressure is **increased** above one atmosphere in some embodiments. Sacks not only fails to teach or suggest this pressure, but further explicitly teaches away from an increased pressure.

However, the outstanding Office Action did not answer the substance of these arguments (or even take notice thereof). Applicants again submit that these features distinguish over the cited art for at least the reasons above and reiterate these arguments with respect to claims 3, 5, 12 and 31 in the present Response.

Applicants also submit that the failure to answer the substance of the arguments presented in the previous Submission renders the Office Action incomplete as to all



matters, which is contrary to the requirements of 37 C.F.R. § 1.104(b). Further, MPEP § 707.07(f) states that “[i]n order to provide a complete application file history and to enhance the clarity of the prosecution history record, an examiner **must** provide clear explanations of all actions taken by the examiner during prosecution of an application” (emphasis added). “Where the applicant traverses any rejection, the examiner should, if he or she repeats the rejection, **take note** of the applicant’s argument and **answer the substance of it**” (*Id.*, emphasis added). “The examiner must address all arguments which have not already been responded to in the statement of the rejection” (MPEP § 707:07(f), Examiner Note 1).

In the present case, the outstanding Office Action failed to address Applicants’ clear traversal with respect to the above-discussed pressure range. Further, failure to specifically respond to Applicants’ arguments likely renders the Office Action arbitrary and capricious, and therefore invalid, under the Administrative Procedure Act (5 U.S.C. § 706), a standard to which all Actions by the USPTO must adhere (see *Dickenson v. Zurko*, 527 U.S. 150 (1999)). Accordingly, Applicants respectfully request that the above arguments be considered on the record. Further, Applicants respectfully note that because the outstanding Office Action is deficient, a next Action in this case **cannot** be made final.

Claims 4, 8, 10, 11, 13, 28-30 and 32 depend from independent claim 3 and add further features thereto. Thus, the arguments above also apply to these dependent claims.

For at least the reasons presented above, it is respectfully submitted that DiCarlo et al. and Sacks, both individually and in combination, fail to teach or suggest all of the features of the above-rejected claims under 35 U.S.C. § 103(a). Accordingly, it is respectfully submitted that the rejection is overcome and respectfully requested that the rejection be withdrawn.

### **Conclusion**

For at least the reasons presented above, it is respectfully submitted that claims 3-5, 10-13, 28-33 and 36 also patentably distinguish over the cited art. Accordingly, it is respectfully requested that the claims be allowed and the application be passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, Applicants' undersigned representative at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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